

U.S. CONSUMER PRODUCT SAFETY COMMISSION WASHINGTON, DC 20207

Interim Enforcement Policy Lead Levels* 2/14/2005

Accessible lead

Accessible lead from a lead-containing consumer product could be associated with increased lead exposure, as determined by increased levels of lead in blood. If a jewelry item contains a high enough amount of accessible lead, then even an acute exposure could result in the blood lead level being chronically elevated. This is because lead has a long half-life in the blood, especially in younger children. This situation would be as deleterious as would chronic exposure to small amounts of lead. The CPSC staff's acid extraction test is used to assess products for accessible lead. Acid extractable lead represents the estimated lead intake from ingestion of an item.

CPSC staff recommends that children not ingest more than 175 μg of accessible lead. This value is based on review of the scientific literature and calculation of the effect of ingested lead on the blood lead level, taking into account a child's physiology (*e.g.*, body weight, blood volume), the bioavailability of lead, body compartmentalization of the lead, and normal elimination of an ingested item from the gastrointestinal tract. Based on factors relating to the elimination of lead from the blood over time, 93% of the initial blood lead concentration remains after one month. Therefore, an initial blood lead level of 10.8 $\mu g/dL$ would result in chronic elevation of the blood lead level above 10 $\mu g/dL$. This level represents an increase of 8.6 $\mu g/dL$ above the geometric mean blood lead level in U.S. children.

Assumptions:

- Chronic elevation of at least one month of blood lead levels above the 10 µg/dL level of concern is considered deleterious.
- NHANES 1999-2000 estimated that the geometric mean blood lead level in children ages 1-5 is $2.2 \,\mu\text{g/dL}$, and 2.2% of this population have blood lead levels that exceed $10 \,\mu\text{g/dL}$.
- Initially, the bioavailable lead enters the blood compartment of the body.
- Elimination of lead from the blood compartment is based on first order kinetics.
- The blood lead half-life is approximately 10 months for short-term lead exposures in young children.
- A 14.5 kg child (average for ages 2-5 years) has a total blood volume of about 1.0 L (based on blood volume of 0.072 L/kg body weight).
- Fifty percent of the acid extractable lead is bioavailable (based on bioavailability of lead in food or water).

^{*} These statements are those of the CPSC staff, have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

Total lead content

CPSC staff evaluated the data on total lead content and acid extractable lead obtained from analysis of children's metal jewelry. The staff determined that jewelry items that contained greater than 0.06 percent lead (600 parts per million) were associated with an increased likelihood of a result greater than 175 µg lead in the acid extraction test, while items containing 0.06 percent lead or less were not associated with acid extraction results greater than 175 µg.

References

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